

DATA PROCUREMENT DOC.  
NO. 1273  
ISSUE  
Draft

**NNM08261607R**

CONTRACT/RFP

EXHIBIT NUMBER

**J-2**

ATTACHMENT NUMBER

**Ares Electric Thrust Vector Control Prototype  
Risk Reduction Program**

PROJECT/SYSTEM

***DATA PROCUREMENT DOCUMENT***

**TBD**

CONTRACTOR

**August 14, 2008**

DATE

National Aeronautics and  
Space Administration

08/14/08

National Aeronautics and Space Administration					DATA PROCUREMENT DOC.		
<b>DOCUMENT CHANGE LOG</b>					NO.                      ISSUE		
					1273                      Draft		
INCORPORATED REVISIONS OUTSTANDING REVISIONS				AS OF: 08-14-08		SUPERSEDING:      PAGE:	
AUTHORITY (DPD Revision)		PORTION AFFECTED - PAGE NO./NO.			REMARKS		
		INTRO	SGR	DRL      DRD			

## 1.0 INTRODUCTION

1.1 Scope: Subject to the Rights in Data clause, this Data Procurement Document (DPD) sets forth the data requirements in each Data Requirements Description (DRD) and shall govern that data required by the DPD for the contract. The contractor shall furnish data defined by the DRD's listed on the Data Requirements List (DRL) by category of data, attached hereto, and made a part of this DPD. Such data shall be prepared, maintained, and delivered to NASA in accordance with the requirements set forth within this DPD. In cases where data requirements are covered by a Federal Acquisition Regulation (FAR) or NASA FAR Supplement (NFS) clause, that clause shall take precedence over the DPD, consistent with clause FAR 52.215-8.

1.2 DPD Description: This DPD consists of a Document Change Log, an Introduction, a Statement of General Requirements, DPD maintenance procedures, a DRL, and the DRD's.

1.2.1 General Requirements: The general requirements, as specified in paragraph 2.0 of this DPD, prescribe those requirements applicable to the preparation, maintenance, and delivery of data that are better defined in aggregate than in the individual DRD's.

1.2.2 Data Requirements List (DRL): Throughout the performance of the contract, the DRL provides a listing by data category of the data requirements of the DPD.

### 1.2.3 Data Requirements Descriptions (DRD's)

1.2.3.1 Each data requirement listed on the DRL is given complete definition by a DRD. The DRD prescribes content, format, maintenance instructions, and submittal requirements.

1.2.3.2 For the purpose of classification and control, DRD's of this DPD are grouped into the following broad functional data categories:

<u>CATEGORY SYMBOL</u>	<u>DESCRIPTION</u>
CD	Contractual Data
CM	Configuration Management
DE	Design and Development Engineering
MA	Management
RM	Reliability and Maintainability
SA	Safety
SE	System Engineering

1.2.3.3 The symbols representing these data categories form part of the prefix of the DRD identification number. The first numerical characters reflect the DPD number.

1.2.3.4 To facilitate the usage and maintenance of the DPD, the DRD's have been sectionalized in accordance with the above data categories.

1.2.3.5 The DRD's are filed by data category and are in alpha-numeric sequence as listed on the DRL page (or pages) that precedes the DRD's.

1.2.4 Document Change Log (DCL): The Document Change Log chronologically records all revision actions that pertain to the DPD.

1.2.5 DPD Maintenance Procedures: Maintenance procedures define the detailed methods to be employed in maintaining the DPD. Detailed maintenance procedures are specified in paragraph 3.0 of this DPD.

- 1.3 Data Types for Contractual Efforts: The types of data and their contractually applicable requirements for approval and delivery are:

<u>TYPE</u>	<u>DESCRIPTION</u>
1*	All issues and interim changes to those issues require written approval from the requiring organization before formal release for use or implementation.
2*	NASA reserves a time-limited right to disapprove in writing any issues and interim changes to those issues. The contractor shall submit the required data to NASA for review not less than 45 calendar days** prior to its release for use. The contractor shall clearly identify the release target date in the "submitted for review" transmittal***. If the data is unacceptable, NASA will notify the contractor within 45 calendar days** from the date of submission, regardless of the intended release date***. The contractor shall resubmit the information for reevaluation if disapproved. The submittal is considered approved if the contractor does not receive disapproval or an extension request from NASA within 45 calendar days**.
3	These data shall be delivered by the contractor as required by the contract and do not require NASA approval. However, to be a satisfactory delivery, the data shall satisfy all applicable contractual requirements and be submitted on time.
4	These data are produced or used during performance of the contract and are retained by the contractor. They shall be delivered only when NASA requests in writing and shall be delivered in accordance with the instructions in the request. The contractor shall maintain a list of these data and shall furnish copies of the list to NASA when requested to do so.
5	These data are incidental to contract performance and are retained by the contractor in those cases where contracting parties have agreed that formal delivery is not required. However, the Contracting Officer or the Contracting Officer's Representative shall have access to and can inspect this data at its location in the contractor's or subcontractor's facilities, or in an electronic database accessible to the Government.
*	Note: Type 1 and Type 2 data may be placed under NASA configuration management control when designated by NASA. CM control requires the contractor to submit Type 1 and Type 2 data updates through Engineering Change Proposals (ECPs).
**	Note: This time limit may be tailored for individual DRD's to meet the requirements of the procuring activity.
***	Note: If the contractor does not identify a release target date or if the intended release date is shorter than 45 calendar days from the date of submission, the 45 calendar days review cycle stands (or the tailored Type 2 time limitation for the specific procurement).

## 2.0 STATEMENT OF GENERAL REQUIREMENTS

- 2.1 Applicable/Reference Documents: Documents included as applicable documents in this DPD are the issue specified in the Statement of Work, and form a part of the DPD to the extent specified herein. Applicable documents listed in Item 15.2 of a DRD are applicable only to the preparation of the deliverable documentation described by that DRD.

References to documents other than applicable documents in the data requirements of this DPD may sometimes be utilized, and shall be indicated in 13. Remarks of the DRD. These do not constitute a contractual obligation on the contractor. They are to be used only as a possible example or to provide related information to assist the contractor in developing a response to that particular data requirement.

## 2.2 Subcontractor Data Requirements

2.2.1 The contractor shall specify to subcontractors and vendors, if any, the availability source of all data required for the satisfactory accomplishment of their contracts. The contractor shall validate these requirements for documents when appropriate; where the requirement concerns other contractor data, the contractor shall provide his subcontractor or vendor with the necessary documents. All such requests shall be accomplished under the auspices of the contractor.

2.2.2 Reference to subcontractor data in the contractor's responses is permissible, providing the references are adequate and include such identification elements as title, number, revision, etc., and a copy of the referenced data is supplied with the response document at time of delivery to NASA.

## 2.3 Data Distribution, Format, Data Restriction Marking, and Transmittal

2.3.1 Distribution: Distribution of required documentation shall be in quantities determined by the Contracting Officer. Recipient names and email (if applicable) addresses shall be noted on a separate distribution list to be furnished by the Contracting Officer. The Contracting Officer's letter may include other information pertinent to delivery of data, as required.

### 2.3.2 Format

2.3.2.1 Electronic Format: Electronic submission of data deliverables is required. Electronic deliverables shall be printable. Data deliverables shall be delivered to NASA in the format specified below unless a specific format is required by a DRD. Data submittals shall consist of a single Adobe Acrobat PDF file and the native format electronic file(s). The preferred native formats include Microsoft Word, Excel, PowerPoint or CAD drawing plot file, as appropriate. Where a single native format file is not possible, multiple files may be integrated into a single ZIP file for submission. The organization of the contents of the integrated ZIP file shall be made readily apparent to the reader, and each file within the integrated product shall be clearly identifiable and traceable within the organization of the integrated product. If files are fragmented, file names shall be labeled logically and contiguously, and the files shall be easily reassembled or merged (e.g. 1 filename, 2 filename, 2a filename, etc.). The software versions shall be confirmed prior to submittals.

2.3.2.2 Hardcopy Format: In addition to the electronic submittal, one hardcopy package of specific data deliverables shall be delivered to the NASA Contracting Officer for the Government contract file. This requirement is indicated in Item 15.4, Format of each DRD. The hardcopy package shall consist of the contractor's Transmittal Memo and one copy of the data deliverable.

### 2.3.3 Data Restriction Marking

2.3.3.1 Data Restriction Determination and Marking Requirements: The contractor shall determine the data restriction that applies to each data deliverable and mark the data restriction on the data coversheet, or indicate the data restriction in the data transmittal package if the data format precludes identification of data restriction directly in the data. The contractor shall make a determination for each individual data deliverable item, and shall not apply a default or blanket data restriction marking to all data deliverables (e.g., "data may be export restricted"). If NASA does not agree with the contractor applied data restriction, the NASA Contracting Officer shall return the data to the contractor, cancel the markings, or ignore the markings consistent with the procedures set forth in the "data rights" clause(s) contained in the contract.

- 2.3.3.2 Data Restriction Categories and Marking Statements: The contractor shall consider the following data restriction categories, as a minimum, and utilize specified marking statements.

If data delivered under this contract is subject to the International Traffic in Arms Regulations (ITAR), the data shall contain an "ITAR Notice" as follows:

**International Traffic in Arms Regulations (ITAR) Notice**

This document contains information which falls under the purview of the U.S. Munitions List (USML), as defined in the International Traffic in Arms Regulations (ITAR), 22 CFR 120-130, and is export controlled. It shall not be transferred to foreign nationals, in the U.S. or abroad, without specific approval of a knowledgeable NASA export control official, and/or unless an export license/license exemption is obtained/available from the United States Department of State. Violations of these regulations are punishable by fine, imprisonment, or both.

If data delivered under this contract is subject to the Export Administration Regulations (EAR), the data shall contain the "EAR Notice" as follows:

**Export Administration Regulations (EAR) Notice**

This document contains information within the purview of the Export Administration Regulations (EAR), 15 CFR 730-774, and is export controlled. It may not be transferred to foreign nationals in the U.S. or abroad without specific approval of a knowledgeable NASA export control official, and/or unless an export license/license exception is obtained/available from the Bureau of Industry and Security, United States Department of Commerce. Violations of these regulations are punishable by fine, imprisonment, or both.

If the contract contains FAR 52.227-14 *Alternate II*, the "Limited Rights Notice" may be applicable to data (other than computer software) delivered under this contract.

If the contract contains FAR 52.227-14 *Alternate III*, the "Restricted Rights Notice" may be applicable to computer software delivered under this contract.

If the contract contains FAR 52.227-20, the "SBIR Rights Notice" may be applicable to SBIR data delivered under this contract.

If the contract contains NFS 1852.237-73, a sensitive information legend may be applicable to information delivered under this contract

In accordance with the applicable data clause (e.g., FAR 52.227-14(c) or FAR 52.227-20(c)), the contractor may be able to assert a copyright claim in data delivered under this contract. When claim to copyright is made, the Contractor shall affix the applicable copyright notices of 17 U.S.C. 401 or 402 and acknowledgment of Government sponsorship (including contract number) to the data when such data are delivered to the Government.

2.3.4 Transmittal

- 2.3.4.1 Data shall be transmitted to NASA by entry into "ICE" as agreed to by the Contracting Officer, COTR, and Project representatives who are responsible to receive, index, and store the data deliverables.

- 2.3.4.2 If email is used to transmit data deliverables, the email size shall be 10 Megabytes or less to ensure receipt by the NASA email servers. Encrypted email format shall be used to transmit data which has been judged sensitive by the contractor (e.g., export controlled, limited rights data, SBIR, restricted computer software, copyrighted, etc.).

- 2.3.4.3 Data Transmittal Package: Each data transmittal package shall include:
- a. Transmittal memorandum that specifies the meta-data below for each data transmittal:
    1. Contract number.
    2. Data Requirements Description (DRD) number.
    3. DRD data type (specified in Item 3 on the DRD).
    4. Submission date or milestone being satisfied.
    5. Document number and revision.
    6. Document title.
    7. File names of all files being delivered; file naming convention shall clearly identify the document being delivered.
    8. Distribution (as defined by the Contracting Officer's letter).
    9. Requested response date.
    10. Contractor assigned data restriction (export controlled, limited rights data, SBIR, restricted computer software, copyrighted, etc.) if not marked on data.
    11. NASA Records Retention Schedule (NRRS) number, if applicable. (See NPR 1441.1, NASA Records Retention Schedules)
  - b. Printable electronic files or hardcopy data.
- 2.3.5 Electronic data deliverables should be transmitted directly to the MSFC Repository through the Digital Asset Manager web interface. Instructions for electronic data submittals can be found at [http://cio.msfc.nasa.gov/repository/repository\\_submittal.html](http://cio.msfc.nasa.gov/repository/repository_submittal.html). Document submitters must register for a Documentum user account through the NASA Account Management System (NAMS). Computer-Aided Design (CAD) drawings shall be submitted in the original native vector, Hewlett-Packard Graphic Language (HPGL), and raster image formats.
- 2.4 Printing: All printing, duplicating, or binding shall be in accordance with NFS 1852.208-81, Restrictions on Printing and Duplicating. Printing of formal reports and Type 1 and 2 data in book format shall be in accordance with the following general specifications:
- a. Method of reproduction – offset/xerography.
  - b. Finished size – 8 1/2" X 11".
  - c. Paper – 20-pound opaque bond.
  - d. Cover – Litho cover stock.
  - e. Pages shall be printed on both sides; blank pages shall be avoided when possible.
  - f. Oversize pages shall be avoided when possible, but if necessary shall be folded to 8 1/2" X 11".
  - g. Binding shall be the most economical method commensurate with the size of the report and its intended use.
- 2.5 Contractor's Internal Documents: The contractor's internal documents shall be used to meet the data requirements of this DPD unless a specific format is required by the applicable DRD.
- 2.6 Document Identification: Type 1 and 2 documents published by the contractor and submitted in response to the data requirements of this DPD shall be identified within an organized identification numbering system prescribed to NASA by the contractor and, if applicable, as approved by NASA. For all data types, the document number, change legend, date, and title constitute the minimum identification of the specific document and shall appear on the cover and title page. The contract number shall also appear on the cover and title page as separate markings. The originator and organization shall be included on the title page. The document number, change legend, and date shall appear on each page of the document. In the front matter of each document, identify the DPD number and applicable DRD number(s) required for document preparation. Successive issues or revisions of documents shall be identified in the same manner as the basic issue and shall have appropriate change identification. Drawings and ECP's are excluded from the marking provisions of this paragraph. All Type 1 documentation, excluding configuration management requirements, shall be marked "PRELIMINARY PENDING NASA APPROVAL," and once approved shall be reissued with "APPROVED BY NASA" and the date and approval authority annotated on the cover.
- 2.7 Reference to Other Documents and Data Deliverables in Data Submittals: All referenced documents shall be made readily available to the cognizant NASA organization upon request. The contractor should make sure that the references are available to NASA in a manner which does not incur delays in the use of the response

document. Reference may be made, within one data submittal, to other data submittals delivered in response to this DPD in those cases where the data required by one DRD may have been delivered by the contractor in response to another DRD. The reference to previously-submitted data shall include the applicable DRD number, data submittal version date, and location within the referenced document.

## 2.8 Maintenance of Type 1 Document Submittals

2.8.1 Revisions of Type 1 documentation may be accomplished either by individual page revision or by a complete reissue of the document identified in accordance with requirements of 2.7 above, with the exception of drawings (which shall be revised in accordance with contract configuration management requirements).

2.8.2 Individual page revisions shall be made as deemed necessary by the contractor or as directed by the Contracting Officer.

2.8.3 A Type 1 document shall be completely reissued when, in the opinion of the contractor and/or NASA, the document has been revised to the extent that it is unusable in its present state, or when directed by the Contracting Officer. When complete reissues are made, the entire contents of the document shall be brought up to date and shall incorporate revised pages. All revisions shall be recorded. A revision log shall identify complete reissues except for periodic reports and documents which are complete within themselves as final.

2.8.4 Changes of a minor nature to correct obvious typing errors, misspelled words, etc., shall only be made when a technical change is made, unless the accuracy of the document is affected.

2.8.5 All revised pages shall be identified by a revision symbol and a new date. Each document shall contain a log of revised pages that identify the revision status of each page with the revision symbol. This list shall follow the table of contents in each document. The line or lines revised on a given page shall be designated by the use of vertical line in the margin of the page, and the change authority shall be indicated adjacent to the change.

2.8.6 Contractor Type 1 documents shall not be submitted containing pen and ink markups which correct, add to, or change the text, unless schedule problems exist and approval is obtained in writing from the Contracting Officer. Such markups, however, shall not exceed 20 percent of the page content and shall be acceptable provided that the reproduced copies are legible. In addition, hand-drawn schematics, block diagrams, data curves, and similar charts may be used in original reports in lieu of formally prepared art work, as long as legibility of copies is not impaired. Acceptability shall be determined by the Contracting Officer.

## 3.0 DPD MAINTENANCE PROCEDURES

3.1 NASA-Initiated Change: New and/or revised data requirements shall be incorporated by contract modification to which the new or revised portion of the DPD shall be appended. The contractor shall notify the Contracting Officer in the event a deliverable data requirement is imposed and is not covered by a DRD, or when a DRD is changed by a contract modification and for which no revision to DPD is appended. In such cases, the contractor shall submit the requested changes to NASA for approval. See paragraph 3.3.1 for change procedures.

3.2 Contractor-Initiated Change: Contractor-proposed data requirements or proposed changes to existing requirements shall be submitted to NASA for approval.

### 3.3 DPD Change Procedures

3.3.1 Changes to a contractual issue of this DPD shall be identified by NASA on the Document Change Log.

3.3.2 The date of the DPD shall be entered under the "as of" block of the Document Change Log. The date that was in the "as of" block shall be entered in the "Superseding" block.

- 3.3.3 The Document Change Log entitled "Incorporated Revisions" shall be changed to indicate the modification number, portions affected, and remarks. All changes to the DPD/DRDs shall be identified in the "Remarks" column.
- 3.4 DPD Reissues
- 3.4.1 The DPD shall be reissued by NASA for each contract modification that affects the DPD and shall supersede the existing DPD in its entirety. Reissues shall be issued by contractual direction. The issue symbol, which shall commence with "A" and progress through "Z," shall be entered in the DPD identification block of each DRD page of the DPD.

**Ares Electric Thrust Vector Control (TVC) Prototype  
Risk Reduction Program**

**Data Requirements List**

<u>DRD</u>	<u>DATA TYPE</u>	<u>TITLE</u>	<u>OPR</u>
CD -- Contractual Data			
1273CD-001	3	Technology Reports	ED03
CM -- Configuration Management			
1273CM-001	1	Deviation/Waiver Approval Report	ED03/JP20
1273CM-002	3	Engineering Drawings and Associated Lists	ED03/JP20
1273CM-003	3	Specification and Drawing Tree	ED03/JP20
DE -- Design and Development Engineering			
1273DE-001	2	Development Test Reports	JP20
1273DE-002	2	Development Test Procedures	JP20
1273DE-003	2	Thermal Analysis Report	JP20
1273DE-004	3	Development Test Planning	JP20
MA -- Management			
1273MA-001	1	Project Management Plan	CS40/JP20
1273MA-002	2	Continuous Risk Management	QD20
1273MA-003	2/3	Major Review Documentation	ED03/JP20
1273MA-004	2	Program/Project Schedules	CS40/JP20
1273MA-005	3	Financial Management Report (533M and 533Q)	CS40
1273MA-006	3	Final Scientific and Technical Report	CS40
1273MA-007	3	Monthly Progress and Final Report	JP20
RM -- Reliability and Maintainability			
1273RM-001	2	Reliability Allocations, Predictions and Analysis Report	QD21/JP20
SA -- Safety			
1273SA-001	2	Safety, Health, and Environmental (SHE) Work Agreement	AS10/QD12
1273SA-002	3	Mishap and Safety Statistics Reports	QD12
SE -- Systems Engineering			
1273SE-001	1	Specifications	ED03/JP20

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** 1273CD-001
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3
  
6. **TITLE:** Technology Reports
  
7. **DESCRIPTION/USE:** Provides NASA with technical information concerning any invention, discovery, improvement, or innovation made by a contractor in the performance of work under this contract for the purpose of disseminating this information to obtain increased use. Also, to provide NASA with data to review for possible patentable items.
  
8. **OPR:** ED03                      9. **DM:** JP20
  
10. **DISTRIBUTION:** Per Contracting Officer's letter
  
11. **INITIAL SUBMISSION:**  
Technology Reporting Plan: Upon Contracting Officer's request.  
Disclosure of Invention and New Technology (NASA Form 1679): Within 2 months of identification of reportable item.  
Interim NASA New Technology Summary Report (NTSR) Form: 12 months from the date of the contract.
  
12. **SUBMISSION FREQUENCY:**  
Technology Reporting Plan: Upon Contracting Officer's request.  
Disclosure of Invention and New Technology (NASA Form 1679): For each reportable item.  
Interim NASA New Technology Summary Report (NTSR) Form: Every 12 months.  
Final NASA New Technology Summary Report (NTSR) Form: Immediately or within three months after completion of contracted work. Final Payment is contingent upon submission of the Final NTSR.
  
13. **REMARKS:** Copies of NASA Form 1679 and the NASA New Technology Summary Report (NTSR) Form (Interim and Final) may be obtained and/or filled out at: <http://entre.nasa.gov/>. These forms may also be obtained from the New Technology Representative (<mailto:Carolyn.E.McMillan@nasa.gov>).
  
14. **INTERRELATIONSHIP:** SOW paragraph 2.1.1
  
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Technology Reports include technical detail as is necessary to identify and fully describe a "Reportable Item". Per NFS 1852.227-70, "Reportable Item" means any invention, discovery, improvement, or innovation of the contractor, whether or not the same is or may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of any work under this contract or in the performance of any work that is reimbursable under any clause in this contract providing for reimbursement of costs incurred prior to the effective date of this contract.
- 15.2 **APPLICABLE DOCUMENTS:**  
NFS 1852.227-70                      New Technology Clause

## DRD Continuation Sheet

**TITLE:** Technology Reports

**DRD NO.:** 1273CD-001

**DATA TYPE:** 3

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**
**15.3 CONTENTS:** The Technology Reports consist of:

- a. Disclosure of Invention and New Technology (Including Software): In accordance with NFS 1852.227-70 (e)(2), the disclosure to the agency shall be in the form of a written report and shall identify the contract under which the reportable item was made and the inventor(s) or innovator(s). It shall be sufficiently complete in technical detail to convey a clear understanding, to the extent known at the time of the disclosure, of the nature, purpose, operation, and physical, chemical, biological, or electrical characteristics of the reportable item. The disclosure shall also identify any publication, on sale, or public use of any subject invention and whether a manuscript describing such invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the Contractor shall promptly notify the agency of the acceptance of any manuscript describing a subject invention for publication or of any on sale or public use planned by the Contractor for such invention. This reporting requirement may be met by completing NASA Form 1679 (latest revision) in hardcopy or online at: <http://centre.nasa.gov/>. Use of this form or the online system is preferred; however, if the form is not used the following information should be provided in order to meet the reporting requirement:
  1. Descriptive title.
  2. Innovator(s) name(s), title(s), phone number(s), and home address(es).
  3. Employer when innovation made (name and division).
  4. Address (place of performance).
  5. Employer status (e.g., Government, college or university, non-profit organization, small business firm, large entity).
  6. Origin (e.g., NASA grant number, NASA prime contract number, subcontractor, joint effort, multiple contractor contribution, other).
  7. NASA Contracting Officer's Technical Representative (COTR).
  8. Contractor/grantee New Technology Representative.
  9. Brief abstract providing a general description of the innovation:
    - (a) Description of the problem or objective that motivated the innovation's development.
    - (b) Technically complete and easily understandable description of innovation developed to solve or meet the objective.
    - (c) Unique or novel features of the innovation and the results or benefits of its application.
    - (d) Speculation regarding potential commercial applications and points of contact (including names of companies producing or using similar products).
  10. Additional documentation.
  11. Degree of technological significance (e.g., modification of existing technology, substantial advancement in the art, major breakthrough).
  12. State of development (e.g., concept only, design, prototype, modification, production model, used in current work).
  13. Patent status.
  14. Dates or approximate time period during which this innovation was developed.
  15. Previous or contemplated publication or public disclosure including dates.
  16. Answers to the following questions (for software only):
    - (a) Using outsiders to beta-test code? If yes, done under beta-test agreement?
    - (b) Modifications to this software continue by civil servant and/or contractual agreement?
    - (c) Previously copyrighted (if so, by whom)?
    - (d) Were prior versions distributed (if yes, supply NASA or Contractor contract)?
    - (e) Contains or is based on code owned by a non-federal entity (if yes, has a license for use been obtained)?
    - (f) Has the latest version been distributed without restrictions as to use or disclosure for more than one year (if yes, supply date of disclosure)?
  17. Name(s) and signature(s) of innovator(s).

**DRD Continuation Sheet****TITLE:** Technology Reports**DRD NO.:** 1273CD-001**DATA TYPE:** 3**PAGE:** 3/3**15. DATA PREPARATION INFORMATION (CONTINUED):**

- b. Interim NASA New Technology Summary Report (NTSR): This report shall consist of a listing of reportable items for the reporting period or certification that there are none. This report shall also contain a list of subcontracts containing a patent rights clause or certification that there were no such subcontracts. Completion of the Interim NTSR shall satisfy this reporting requirement. Use of the form utilizing the online system at <http://entre.nasa.gov/> is preferred; however an alternate format is acceptable provided all required information is provided.
- c. Final NASA New Technology Summary Report (NTSR): This report shall consist of a comprehensive list of all reportable items for the contract duration or certification that there are none. This report shall also contain a list of subcontracts containing a patent rights clause or certification that there were no such subcontracts. Completion of the Final NTSR shall satisfy this reporting requirement. Use of the form utilizing the online system at <http://entre.nasa.gov/> is preferred; however an alternate format is acceptable provided all required information is provided.
- d. Subcontracts: The contractor shall provide copies of subcontracts containing a patent rights clause upon Contracting Officer's request.

- 15.4 **FORMAT:** The Disclosure of Invention and New Technology (Including Software) report may use NASA Form 1679 (latest version) or the online system at: <http://entre.nasa.gov/>, or provide sufficient information to meet the reporting requirement.

The interim and final NASA New Technology Summary Reports may use the NTSR Form (Interim or Final whichever is applicable) utilizing the online system at: <http://entre.nasa.gov/> or provide sufficient information to meet the reporting requirement.

- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273CM-001**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Deviation/Waiver Approval Request
7. **DESCRIPTION/USE:** Deviation: A specific written authorization granted before the fact to depart from a particular Government-controlled requirement for a limited application. Waiver: A specific written authorization accepting a departure after occurrence from a Government-controlled requirement for a limited application.
8. **OPR:** ED03/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As required
12. **SUBMISSION FREQUENCY:** As required
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.2.1
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Deviation/Waiver Approval Request (DAR) requests approval to depart from a Government-controlled requirement.
- 15.2 **APPLICABLE DOCUMENTS:**  
MSFC-STD-3394                      *Standard for Contractor Configuration Management, MSFC Programs/Projects*
- 15.3 **CONTENTS:** DARs shall be prepared as specified in MSFC-STD-3394. The Program Control Number (PCN), as assigned by MSFC, and the DAR number assigned by the contractor shall be shown on all forms.
- 15.4 **FORMAT:** MSFC Form 847, "Deviation/Waiver Approval Request (DAR)" or equivalent, shall be used to document deviations/waivers.
- 15.5 **MAINTENANCE:** All requested changes to a DAR require submittal of a DAR revision.
- 15.6 **APPROVAL OF DEVIATIONS/WAIVERS:** Receipt of contractual approval from the procuring activity shall constitute the sole authority for the contractor to effect a DAR. This approval will be noted by disposition notation and the authorizing signature on the MSFC Form 847, or equivalent.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273CM-002**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Engineering Drawings and Associated Lists
7. **DESCRIPTION/USE:** To provide engineering data defining the design to the extent required to support manufacturing and test of the prototype electric thrust vector control (TVC) system. Engineering drawings and associated lists shall be sufficient to depict the detailed configuration of all system, subsystem, and components. 2D and 3D CAD models shall be submitted as supplemental information.
8. **OPR:** ED03/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Three weeks prior to Preliminary Design Review (PDR). Parts Marking Plan: 60 calendar days after contract award.
12. **SUBMISSION FREQUENCY:** Three weeks prior to each major review, as part of an Acceptance Data Package (ADP), and as requested. In addition, 3D CAD Models shall be submitted between milestones as requested by the procuring activity.
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.5.2
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Engineering drawings disclose (directly or by reference) the physical and functional requirements of an item by means of graphics or textual presentation or combinations of both, as supplemented by 3D models.
- 15.2 **APPLICABLE DOCUMENTS:**

ASME Y14.100	<i>Engineering Drawing Practices</i>
ASME Y14.41	<i>Digital Product Definition Data Practices</i>
ASME Y14.5M	<i>Dimensioning and Tolerancing</i>
MIL-STD-961	<i>Department of Defense Standard Practices, Defense Specifications</i>
MIL-STD-130M	<i>Department of Defense Standard Practices, Identification Marking of U.S. Military Property</i>
NASA-STD-6002	<i>Applying Data Matrix Identification Symbols on Aerospace Parts</i>
- 15.3 **CONTENTS:** Requirements:
  - a. Part I - Engineering drawings and associated lists shall meet the requirements of ASME Y14.100. Geometric Dimensioning and Tolerancing shall be implemented in accordance with ASME Y14.5M. Supplemental 2D/3D CAD shall meet the requirements of ASME Y14.41. Engineering drawings and associated lists of end items, elements and/or all components and assemblies shall be provided to define the details necessary for the manufacture, test, inspection, operations and logistic support of the system. This definition shall:
    1. Reflect the end-product at its current level of design maturity.
    2. Provide the engineering data for logistics support products.
    3. Provide the necessary data to permit manufacture and/or acquisition of items identical to the original item(s).
    4. Document directly or by reference the following:
      - (a) Details of unique processes (i.e., not published or generally available to industry) when essential to design and manufacture.
      - (b) Performance ratings.

## DRD Continuation Sheet

**TITLE:** Engineering Drawings and Associated Lists

**DRD NO.:** 1273CM-002

**DATA TYPE:** 3

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- (c) Dimensional and tolerance data (Geometric Dimensioning and Tolerancing (GDT) shall be required between all external and major internal interfaces).
  - (d) Critical manufacturing processes and assembly sequences, and rigging procedures.
  - (e) Diagrams.
  - (f) Mechanical and electrical connections.
  - (g) Physical characteristics, including form and finish.
  - (h) Details of material identification, including heat treatment and protective coatings.
  - (i) Inspection, test, and evaluation criteria.
  - (j) Equipment calibration requirements.
  - (k) Quality assurance requirements.
  - (l) Hardware marking requirements.
  - (m) Requirements for reliability, maintainability, environmental conditions, shock, and vibration testing and other operational or functional tests.
- 5. Limited rights-in-data items - Engineering drawings for items which the Government does not have unlimited rights in data shall specify the form, fit, and function requirements of the item and conform to the requirements for a control drawing as defined in ASME Y14.100 or a specification prepared in accordance with the requirements of MIL-STD-961.
- b. Part II - Cable interconnect diagrams (CID's), electrical system schematics, and wiring lists. Cable interconnect diagrams, electrical system schematics, wiring lists, and fluid system schematics shall be prepared in accordance with ASME Y14.100. Part I drawings shall be utilized to the maximum extent possible in providing the design definition. The drawings shall include the following:
  - 1. Cable interconnect diagrams shall show graphically the arrangement of external electrical cabling which interconnects electrical assemblies and/or equipment. The CID shall show all cable runs and terminations; each cable shall be identified by reference designation number. The connector short sign shall be identified.
  - 2. Electrical system schematics shall illustrate and describe circuit items with symbols placed such that a circuit may be traced from item to item in the sequence of its function. The placement and arrangement of these circuits shall follow a logical sequence of presentation to provide a clear description of the distribution.
  - 3. Component Level Documentation - Schematics and/or wiring lists for components, including interconnecting cable harnesses, shall be provided.
  - 4. Overall Grounding Documentation - The grounding schematic shall show the details of all grounds and power returns from source to loads. All connections shall be shown. It shall also show details of all Electrical Ground Support Equipment interconnections to facility and safety grounds.
  - 5. The Fluid system schematic shall illustrate and describe all components with symbols and flow designators such that the fluid system may be traced from component to component (such as pumps, valves, meters, regulators, and filters). The schematics shall document the range requirements (flow, temperature, and pressure) for all component external interfaces and line sizes. The placement and arrangement of these components shall follow a logical sequence of presentation to provide a clear description of the flow of fluids in the system. The schematics shall reference engineering drawings and associated lists for configuration details.
- c. Engineering drawing shall specify marking criteria and methods for identification of parts produced or procured. Markings shall meet criteria of NASA-STD-6002. All parts shall be physically marked. When physical marking or tagging causes a deleterious effect, labels, tags, and nameplates may be considered. MIL-STD-130 shall be used for paper labels, tagging, and nameplates. However, the Data Matrix Symbol format shall be used for Machine Readable Identification on paper labels and tagging.
- d. The Contractor shall prepare a Parts Marking Plan as described in NASA-STD-6002 to assure compatibility and integrity of the marking effort. The Parts Marking Plan shall provide a holistic approach for marking parts assuring that the preferred methods described in NASA-STD-6002 are fully utilized within best engineering practice.

**DRD Continuation Sheet****TITLE:** Engineering Drawings and Associated Lists**DRD NO.:** 1273CM-002**DATA TYPE:** 3**PAGE:** 3/3**15. DATA PREPARATION INFORMATION (CONTINUED):**

- 15.4 **FORMAT:** Format of engineering drawings shall be in accordance with ASME Y14.100. Drawings shall be delivered in PDF format. 2D/3D CAD shall be in accordance with ASME Y14.41, in the current version of native developed CAD, fully parametric and associative. The contractor shall deliver ProEngineer compatible 3D models of the components. Alternate formats may be acceptable upon negotiation. All documentation/data shall include the contractor's CAGE code and document numbers. The Contractor may submit electronic files of drawings and CAD models via CD, DVD, or direct electronic transfer (Product Data Management (PDM) Tool, FTP, etc.) as specified by the Government [Requisitioner: specify preferred electronic delivery method if known].

For all binary deliveries the contractor shall include a listing of the creating environment to include:

- a. CAD product name/version/patches.
- b. Subordinate (plug-in) software/version/patches.
- c. Description of hardware.
- d. Operating system/version/patches.

- 15.5 **MAINTENANCE:** All documents produced under this DRD must be maintained current. Changes to and/or updating of engineering drawings and associated lists shall be in accordance with the contractor's approved drawing system and the provisions herein. Changes to engineering drawings under the Government's Class I change control shall be submitted by Engineering Change Proposal. The contractor shall maintain the capability to restore and modify any engineering data used in the design through the project lifecycle.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** 1273CM-003
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Specification and Drawing Trees
7. **DESCRIPTION/USE:** A specification tree is a generation breakdown of the specifications with interrelationships, as applicable, to the configuration items. A drawing tree is a generation breakdown of the engineering drawings that depicts the allocation of requirements of the configuration item specification.
8. **OPR:** ED03/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Specification and Drawing Trees- three weeks prior to Critical Design Review (CDR).
12. **SUBMISSION FREQUENCY:** Update as required
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.5.3
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Specification and Drawing Trees depict the hardware and software configuration items in top down, or generation breakdown form.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The specification and drawing trees shall consist of an indentured or generation breakdown listing of all specifications or drawings applicable to a configuration item or items.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by complete reissue or change page if hard copy is necessary.

## DATA REQUIREMENTS DESCRIPTION (DRD)

- |                         |              |                                      |
|-------------------------|--------------|--------------------------------------|
| 1. <b>DPD NO.:</b> 1273 | ISSUE: Draft | 2. <b>DRD NO.:</b> <b>1273DE-001</b> |
| 3. <b>DATA TYPE:</b> 2  |              | 4. <b>DATE REVISED:</b>              |
|                         |              | 5. <b>PAGE:</b> 1/1                  |
6. **TITLE:** Development Test Reports
7. **DESCRIPTION/USE:** To report the results of the development test activities.
8. **OPR:** JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** 20 calendar days after completion of each development test activity
12. **SUBMISSION FREQUENCY:** Once per development test activity
13. **REMARKS:**
14. **INTERRELATIONSHIP:** DRD 1273DE-002, *Development Test Procedures*. SOW paragraph 2.7
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Development Test Reports (i.e., procedure, memo, assessment, test reports, inspection reports) document the results of each development test activity.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The Development Test Reports shall contain the following:
- a. Conclusions and recommendations relative to success of the development test activity.
  - b. Description of deviations from nominal results, failures, approved corrective actions and procedures, and retest.
  - c. Traceability back to the requirement.
  - d. Copy of as-run procedure (as appropriate).
  - e. Identification of test configuration.
  - f. Specific results of each procedure including automated test segments and associated analyses.
  - g. Performance data, plots, and pictures (as appropriate).
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273DE-002**
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Development Test Procedures
7. **DESCRIPTION/USE:** To document and provide procedures for performing development test, inspection, or demonstration activities.
8. **OPR:** JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Seven (7) calendar days prior to Test Readiness Review (TRR)
12. **SUBMISSION FREQUENCY:** One time submittal
13. **REMARKS:**
14. **INTERRELATIONSHIP:** DRD 1273DE-001, *Development Test Reports*. SOW paragraph 2.7
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Development Test Procedures define the detail instructions to be followed in conducting the identified development activities (test, inspection, or demonstration).
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** Each Development Test Procedure shall contain the following:
  - a. Identification of item/article being subjected to test, inspection, or demonstration.
  - b. Identification of objectives established for the particular test, inspection, or demonstration.
  - c. Description of steps and operations, in sequence, to be taken.
  - d. Identification of measuring and recording equipment to be used, specifying range, accuracy, and type and any special instructions for operating such equipment.
  - e. Layouts, schematics, or diagrams showing identification, location, and interconnection of item/article, support equipment, and measuring equipment.
  - f. Identification of hazardous situations or operations.
  - g. Precautions and safety instructions to ensure safety of personnel.
  - h. Environmental and/or other conditions to be maintained with tolerances.
  - i. Constraints on test, inspection, or demonstration.
  - j. Any developed test-stand software (as applicable).
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

- |                         |              |                                      |
|-------------------------|--------------|--------------------------------------|
| 1. <b>DPD NO.:</b> 1273 | ISSUE: Draft | 2. <b>DRD NO.:</b> <b>1273DE-003</b> |
| 3. <b>DATA TYPE:</b> 2  |              | 4. <b>DATE REVISED:</b>              |
|                         |              | 5. <b>PAGE:</b> 1/1                  |
6. **TITLE:** Thermal Analysis Report
7. **DESCRIPTION/USE:** To be used to communicate the thermal analysis that was used during design.
8. **OPR:** JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Thermal models and geometry models as part of the Preliminary Design Review (PDR) data package.
12. **SUBMISSION FREQUENCY:** As part of the Critical Design Review (CDR) data package
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.5.4
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Thermal Analysis Report provides information necessary to understand the thermal analysis that was performed during design and development.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The Thermal Analysis Report shall document the thermal analysis of the prototype electric TVC system. Critical thermal requirements shall be summarized. Analysis which shows the system components to be within material temperature limits, supports structural analysis such as clearance studies, or defines thermal interfaces shall be documented. Each analysis description shall include thermal environments, material properties, and results.  
When computer analyses, including finite element analyses are used, deliverable information shall include a description of the analyses with applicable geometry, dimensions, loads, other boundary conditions, annotated input data file(s), plots of model geometry, and results. This information shall be sufficient to recreate the analysis if necessary. Computer programs, data inputs, and data outputs utilized in these analyses must be documented and available to the Government upon request.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273DE-004**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Development Test Planning
7. **DESCRIPTION/USE:** To provide details and discussions of the identified development test activities and provide an overview approach of the overall development test program.
8. **OPR:** JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Draft as part of the Preliminary Design Review (PDR) data package
12. **SUBMISSION FREQUENCY:** Final as part of the Critical Design Review (CDR) data package
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.7
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Development Test Planning information provides a detail description of the development testing approach.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The Development Test Planning information shall include the following:
  - a. Detail descriptions of all development test activities (i.e., tests, analyses, inspections) to be performed based on the identified requirements. Identify any prerequisites, constraints, and objectives for all the development test activities.
  - b. Detail time correlated sequence of development test activities.
  - c. Description and planned usage of the support equipment, software, facilities, and tooling necessary to execute the development test activities.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** 1273MA-001
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Project Management Plan
7. **DESCRIPTION/USE:** To provide an overall description of the process and methods planned for accomplishing the Statement of Work.
8. **OPR:** CS40/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Preliminary with proposal
12. **SUBMISSION FREQUENCY:** 30 calendar days after Authority to Proceed (ATP) and update as required
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.1
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Project Management Plan provides the basic planning document which describes the contractor's overall plan for performing the contracted scope of work.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The Project Management Plan shall provide a description of the contractor's management concepts, practices, approaches, plans, and schedules necessary for accomplishing (managing and controlling) the project tasks described in the Statement of Work. In addition, the plan shall present those management systems to be utilized to define and delegate task assignments and shall define the organizational relationships of the contractor, subcontractors, and the Government.  
Management Overview - A brief description of the project objectives, the system to be furnished, and the equipment (systems), and software that is to be provided. Include a concise summary of the contractor's management organization responsible for performance of the contract, including interrelationships with the subcontractors.  
Management Systems - This plan shall briefly describe how the various management systems are to be integrated and used for the overall project management and reporting of:
  - a. Project management.
  - b. Contract management.
  - c. Financial management.
  - d. Data requirements management.
  - e. Schedules (planning and control).
  - f. Performance management (cost/schedule/technical).
  - g. Engineering management.
  - h. Logistics management.
  - i. Test/verification management.
  - j. Subcontractor/vendor management.
  - k. Procurement management.
  - l. Systems engineering management.
  - m. Safety, reliability, maintainability, quality assurance.
  - n. Automated information management systems.
  - o. Communications.
  - p. Support equipment management.
  - q. Facilities utilization and management.

## DRD Continuation Sheet

**TITLE:** Project Management Plan

**DRD NO.:** 1273MA-001

**DATA TYPE:** 1

**PAGE:** 2/2

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

- r. Project reviews.
- s. Environmental impact management.

NOTE: It is not intended that this plan duplicate other plans called for in the Data Requirements List. This plan should summarize the overall project and reference or summarize other plans where appropriate and shall reference contractor internal procedures where applicable.

15.4 **FORMAT:** Contractor format is acceptable.

15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** 1273MA-002
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Continuous Risk Management
7. **DESCRIPTION/USE:** To provide a baseline document for planning, management, control, and implementation of the contractor's risk management program.
8. **OPR:** QD20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Risk Management Plan, Risk List, Analysis, and Tracking Report - 90 calendar days after Authority to Proceed (ATP). Lessons Learned Search Reports and Lessons Learned Submittals – as part of the Preliminary Design Review (PDR) data package.
12. **SUBMISSION FREQUENCY:** Shall update and submit Risk List, Analysis, and Tracking Report in accordance with the NASA Project Risk Management Plan, every 30 days (monthly). Shall update Plan as required. Lessons Learned Search Reports and Lessons Learned Submittals shall be due at each subsequent major milestone [Critical Design Review (CDR) and Acceptance Reviews (AR)] and as appropriate throughout the project lifecycle.
13. **REMARKS:** Reference is made to the following documents:  
     NPD 8700.1            *NASA Policy for Safety and Mission Success*  
     Notice 97-58        *NASA Procurement Notice for Risk-Based Acquisition Management (R-BAM)*  
     MWI 7120.6        *Program and Project Continuous Risk Management*
14. **INTERRELATIONSHIP:** SOW paragraph 2.1.5
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Continuous Risk Management addresses how NASA risk management requirements are to be implemented throughout the program's life cycle.
- 15.2 **APPLICABLE DOCUMENTS:**  
     NPR 7120.5C        *NASA Program and Project Management Processes and Requirements*  
     NPR 7120.5D        *NASA Space Flight Program and Project Management Requirements*  
     NPR 7120.8        *NASA Research and Technology Program and Project Management Requirements*  
     NPR 8000.4        *Risk Management Procedural Requirements*
- 15.3 **CONTENTS:** The Continuous Risk Management shall specify how the contractor will satisfy the risk management requirements of NPR 7120.5C, NPR 7120.5D and NPR 7120.8 by using the risk management procedures and guidelines specified in NPR 8000.4 in a manner that is compatible with the Project Office's Risk Management Plan. The plan shall specify how the contractor will document risk management activities and how the contractor will communicate risk issues and concerns to the Government.

The Risk List shall identify program risks with regards to budget, cost, safety, schedule, and technical risks.

The Risk Analysis shall contain the following data: 1) References to source data for identified risk areas such as test data, lessons learned, Failure Modes Effects Analysis (FMEA), hazard analysis and technical analysis; 2) Catalog of all program/project risks; 3) Risk evaluation data that identifies the impact, probability and time frame for each risk; 4) Risk classification and prioritization data.

**DRD Continuation Sheet****TITLE:** Continuous Risk Management**DRD NO.:** 1273MA-002**DATA TYPE:** 2**PAGE:** 2/2

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**15. DATA PREPARATION INFORMATION (CONTINUED):**

The Risk Tracking Report shall contain the following data: 1) Status of all risks and risk metrics; 2) Risk mitigation plans and verification of completed mitigation plans; 3) Risk decision summaries that will document re-planning of unsuccessful mitigation plans and risk acceptance/closures.

Lessons Learned Search Reports shall specify how the contractor has satisfied the requirements of NPR 7120.5C, NPR 7120.5D and NPR 7120.8 by incorporating lessons learned. They shall contain the following data: 1.) Guidelines used to determine relevant searches; 2.) Details of searches that were performed, together with accompanying rationale; 3.) A list of relevant articles returned, source, and relevance to the project; and 4.) How the project plans to incorporate relevant lessons learned.

Lessons Learned Submittals shall include: 1.) Description of the driving event; 2.) Description of the lessons learned and any corrective action that may have resulted; 3.) Recommended changes to specifications or procedures.

15.4 **FORMAT**: Contractor format is acceptable unless specified by the Program Risk Management Plan.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273      **ISSUE:** Draft
2. **DRD NO.:** 1273MA-003
3. **DATA TYPE:** 2/3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Major Review Documentation
7. **DESCRIPTION/USE:** To conduct formal technical reviews to evaluate design and status, document baselines, and monitor disposition of action items and Review Item Discrepancies (RIDs).
8. **OPR:** ED03/JP20      9. **DM:** JP20
10. **DISTRIBUTION:** See Attachment 2
11. **INITIAL SUBMISSION:** See Attachment 2
12. **SUBMISSION FREQUENCY:** Per technical review
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.1.6.3
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Major Review Documentation contains all of the required documentation necessary to support major technical reviews.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** Major Review Documentation required for the following technical reviews shall be provided as described in Attachment 1. Additional documentation to be provided are:
  - a. Agenda - The agenda shall specify the time and place for the scheduled review, specific review items, supporting documentation, and key participants. Submit approved copies at the review. See Attachment 2.
  - b. Presentation Charts - Presentation charts shall be submitted at the review. They shall summarize the details contained in the data package and shall identify compliance with the contract requirements. See Attachment 2 for distribution and availability of data.
  - c. Minutes - The minutes shall contain a description of the review with sufficient detail to enable the review to be made a matter of record. The minutes shall include the presentation charts, a listing of RIDs, action items with actionee and suspense (closure) data. See Attachment 2 for distribution and availability of data.
  - d. RIDs - RIDs showing action items, actionees, suspense dates and closure status shall be submitted. See Attachment 2 for distribution and availability of data.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** As required to correct errors and to maintain RID closure status.

**ATTACHMENT 1**

Page: 2/3

1. Preliminary Design Review (PDR)  
Engineering Drawings and Associated Lists (DRD 1273CM-002)  
Thermal Models and Geometry Models (DRD 1273DE-003)  
Development Test Planning (DRD 1273DE-004)  
Lessons Learned Search Reports and Lessons Learned Submittal (DRD 1273MA-002)
2. Critical Design Review (CDR)  
Specification and Drawing Tree (DRD 1273CM-003)  
Thermal Analysis Report (DRD 1273DE-003)  
Development Test Planning (DRD 1273DE-004)  
Lessons Learned Search Reports and Lessons Learned Submittal (DRD 1273MA-002)  
Reliability Allocation, Predictions and Analysis Report (DRD 1273RM-001)  
Specifications (DRD 1273SE-001)
3. Test Readiness Review (TRR)  
Development Test Procedures (DRD 1273DE-002)

**ATTACHMENT 2**

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Technical Review Documentation  
Distribution and Availability of Data

Document	Type	Design Reviews PDR, CDR, TRR (Copies/Availability)
Agenda	2	One/15 calendar days prior to review  Approved copies at review
Data Package	3	20/Two weeks prior to review
Presentation Charts	3	One to each attendee at review
Minutes	2	One to each attendee/Within two weeks
RIDs (Generated at Review)	2	Five per RID/ Within seven (7) calendar days of closure date

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** 1273MA-004
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Program/Project Schedules
7. **DESCRIPTION/USE:** To provide the contractor's time-phased plan, current status, key milestones, task interdependencies, and major development phases necessary to accomplish the total scope of work. This schedule will be used to provide management insight into contractor status, potential problem areas, and critical path identification, which will serve as the basis for evaluating contractor performance.
8. **OPR:** CS40/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Preliminary with proposal. Initial - first calendar month following the end of the first full month after Authority to Proceed (ATP).
12. **SUBMISSION FREQUENCY:** Monthly, no later than the 10<sup>th</sup> day of the calendar month following the end of the contractor's accounting month.
13. **REMARKS:** The schedule will be baselined at some point after ATP as agreed to by both parties and not to exceed 90 days after ATP. Reference is made to NPR 7120.5 (Current Revision), *NASA Program and Project Management Processes and Requirements*. This document shall be used as a guide in preparation of the schedules.
14. **INTERRELATIONSHIP:** DRD 1273MA-001, *Project Management Plan*. SOW paragraph 2.1.4
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Program/Project Schedules provides data for the assessment of contract schedule and logic network of the tasks to be performed.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The Program/Project Schedules shall include tasks necessary to accomplish the total scope of work. The schedule shall also include all logical relationships (interdependencies) between tasks. Schedules shall contain the approved baseline schedule as well as current forecasted dates. All key milestones shall be clearly identified and logically linked to related tasks. The program/project schedule shall be created and maintained in management software that supports automated time phasing of tasks, a logic driven critical path, schedule assessment, and trend analysis capabilities. Program/Project Schedules and the Logic Network shall be reported in four sections. The following deliverables shall be extractions from the automated logic network database. All data contained in the sections shall be consistent, statused monthly and based on the same cutoff date.
  - a. Summary Schedule – One page, top level, Gantt-type summary document arranged by task that reflects all contract and controlled milestones, major program/project phases (i.e., design, fabrication, integration, assembly, etc.) and all end item deliveries.

## DRD Continuation Sheet

**TITLE:** Program/Project Schedules

**DRD NO.:** 1273MA-004

**DATA TYPE:** 2

**PAGE:** 2/2

**15 DATA PREPARATION INFORMATION (CONTINUED):**

- b. Logic Network Database -- an automated logic network database consisting of schedule data for all project task elements. The entire scope of work shall be broken into schedule tasks and milestones at a consistent level of detail to allow discrete progress measurement and visibility into the overall development, fabrication, integration, assembly, test, and delivery phase of each end item deliverable. Additionally, all schedule tasks/milestones shall be integrated with the appropriate sequence relationships to provide a total end-to-end logic network leading to each end-item delivery. This database shall contain all contract and controlled milestones, key subcontractor milestones, end item delivery dates, key data delivery dates, and key Government Furnished Property (GFP) need dates. The database shall contain the appropriate task coding attributes necessary to provide sort, select, and summarization capabilities for, but not limited to, project task element, program/project phase, and level-of-effort tasks. The logic network database serves as the basis for identification of program/project critical paths as well as critical schedule analysis.
- c. Critical Path Report -- This report shall be an extract from the Logic Network Database and include all tasks and milestones with 10 workdays or less of total slack (float). The report shall be submitted in a waterfall format and organized in manner such that the path with the least amount of slack is delineated first and followed by each successive path according to total slack values.
- d. Contractor Schedule Assessment Report -- This report shall contain a count of the total number of tasks, milestones and non-detail (e.g., summary, hammock, rollup, etc.) activities contained in the schedule, a count of the number of completed tasks and milestones, a count of the number of tasks and milestones to be completed, a count of the number of tasks and milestones that have no predecessor and/or no successor relationships, a count of the total number of tasks and milestones that have a total float (slack) value greater than 25% of the remaining duration of the total program/project schedule, a count of the total number of non-detail (e.g., summary, hammock, rollup, etc.) activities that have any predecessor or successor logical relationships, a count of the total number of tasks and milestones that have forced or fixed dates. The report shall contain critical path narratives explaining changes and impacts to the critical paths listed in section c above. The report shall contain narrative explanations for contract milestones and significant project milestones that have moved more than 45 calendar days into the future from their baseline dates. Program/Project milestones shall be identified and negotiated with the project office. These narratives shall include a proposed work-around schedule detailing how the contractor plans to recover the lost schedule time.

15.4 **FORMAT:** Submission of the deliverables in 15.3 shall be by standard hardcopy and electronic media. Electronic media submittals shall be in native file format utilizing schedule management software approved by the MSFC project office. A legend identifying the contractor's schedule symbols used and their meaning shall be provided.

15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273MA-005**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Financial Management Report (533M and 533Q)
7. **DESCRIPTION/USE:** To provide quarterly and monthly financial reports for monitoring program costs. The 533M and 533Q reports are the official cost documents used at NASA for cost type, price redetermination, and fixed price incentive contracts.
8. **OPR:** CS40                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** An initial report in the 533Q format is required within 30 working days after Authority to Proceed. Initial 533M reporting shall begin no later than 30 days after the incurrence of cost.
12. **SUBMISSION FREQUENCY:** 533Q: Quarterly; no later than the 15th day of the month preceding the quarter being reported in columns 8a, 8b, and 8c. 533M: Monthly; no later than 10 working days following the close of the contractor's accounting month.
13. **REMARKS:** The data contained in the reports shall be auditable using Generally Accepted Accounting Principles.
14. **INTERRELATIONSHIP:** *NASA Contractor Financial Management Reporting*, (November 2004). SOW paragraph 2.1.2
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Financial Management Report provides data on accumulated costs and funding projections for management of the contract.
- 15.2 **APPLICABLE DOCUMENTS:**  
NPR 9501.2D                      *NASA Contractor Financial Management Reporting*
- 15.3 **CONTENTS:** The elements of cost for financial reporting shall be mutually agreed by the contractor and NASA project office. The Financial Management Reports (533M and 533Q) shall be prepared in accordance with the detailed instructions provided on the reverse side of the NASA Forms 533M and 533Q and the supplementary instructions set forth in NPR 9501.2D, Chapter 3.
  - a. 533Q Quarterly Report shall include actual cost and cost projections at the total contract level. The initial 533Q report shall reflect the original contract value detailed by negotiated reporting categories and serve as the original baseline plan.
  - b. 533M Monthly Report shall include actual cost and cost projections at the total contract level.

A summary level page reflecting cumulative total contract cost since inception shall be included. Reconciliation between the 533M/533Q and the Cost Performance Report (CPR) shall be submitted as an attachment to the 533M/533Q Report.
- 15.4 **FORMAT:** Contractor internal automated printout reports may be substituted for 533M/533Q forms (with NASA Contracting Officer's approval) provided that the contractor report contains all of the data elements required by NASA Forms 533M and 533Q. Electronic submission of contractor data is strongly encouraged (reference NPR 9501.2, paragraph 3.7).
- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273MA-006**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Final Scientific and Technical Report
7. **DESCRIPTION/USE:** To provide a summary of the results of the entire contract effort, including recommendations and conclusions based on the experience and results obtained.
8. **OPR:** CS40                      9. **DM:** JP20
10. **DISTRIBUTION:** In addition to the final report submitted to the Contracting Officer, the contractor shall concurrently provide to the Center STI/Publication Manager and the NASA Center for AeroSpace Information (CASI) a copy of the letter transmitting the final report to the Contracting Officer. The copy of the letter shall be submitted to CASI at the following address: Center for AeroSpace Information (CASI); Attn: Acquisitions; 7115 Standard Drive; Hanover, Maryland 21076-1320. The copy of the letter to the Center STI/Publication Manager shall be submitted to IS20.
11. **INITIAL SUBMISSION:** 30 calendar days after completion of contract
12. **SUBMISSION FREQUENCY:** One time submittal
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.1.1
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Final Scientific and Technical Report summarize the results of the entire contract work.
- 15.2 **APPLICABLE DOCUMENTS:**

NFS 1852.235-73	<i>Final Scientific and Technical Reports</i>
NPR 2200.2	<i>Guidelines for Documentation, Approval, and Dissemination of NASA Scientific and Technical Information</i>
- 15.3 **CONTENTS:** The Final Scientific and Technical Report shall be prepared and submitted in accordance with NFS 1852.235-73. The report shall summarize the results of the entire contract, including recommendations and conclusions based on the experience and results obtained. The report shall include tables, graphs, diagrams, curves, sketches, photographs, and drawings in sufficient detail to explain comprehensively the results achieved under the contract. The report shall include a completed report documentation page (Standard Form 298) as the final page, per NFS 1852.235.73(c).
- 15.4 **FORMAT:** The final report shall be of a quality suitable for publication and shall follow the formatting and stylistic guidelines contained in NPR 2200.2. Electronic formats for submission should be used to maximum extent possible. Information regarding appropriate electronic formats for final reports is available at <http://www.sti.nasa.gov> under "Publish STI – Electronic File Formats". The final page of the report shall be in accordance with Standard Form 298. The report shall be provided in both hardcopy and electronic versions. Electronic format shall be in accordance with NFS 1852.235-73.
- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft                      2. **DRD NO.:** **1273MA-007**
3. **DATA TYPE:** 3                      4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Monthly Progress and Final Report
7. **DESCRIPTION/USE:** To provide visibility to contractor and MSFC project management of actual and potential problems and progress toward meeting the cost, technical and schedule requirements.
8. **OPR:** JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** First calendar month following the end of the first full month after Authority to Proceed (ATP), unless otherwise specified by the Contracting Officer
12. **SUBMISSION FREQUENCY:** Monthly Progress Report: 10 calendar days following the end of each month.  
Final Report: 21 calendar days after contract completion.
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.1.3
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Monthly Progress and Final Report provide data for the assessment of monthly cost, technical and schedule progress.
- 15.2 **APPLICABLE DOCUMENTS:**  
NFS 1852.235-74                      *Additional Reports of Work - Research and Development*
- 15.3 **CONTENTS:**
  - a. The Monthly Progress and shall meet the requirements of NFS 1852.235-74 and shall contain the following:
    1. Work accomplished for current reporting period, including a report of overall cost, technical and schedule performance.
    2. Work planned for next reporting period.
    3. Current problems which impede performance or impact program schedule or cost, and proposed corrective action.
    4. Other information that assist the Government in evaluating the contractor's cost, technical and schedule performance, e.g., innovative processes and cost reduction initiatives.
  - b. The Final Report shall:
    1. Document the overall project technical performance to include:
      - (a) Final system configuration.
      - (b) Performance verification testing against the technical specification.
      - (c) Lessons learned during the conduct of project.
      - (d) Recommendations for improvement.
    2. Document the effectiveness of the risk reduction efforts and extensibility of the delivered system to qualification in future launch vehicle applications.
    3. Include DRD 1273SE-001, *Specifications*.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273RM-001**
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Reliability Allocation, Predictions and Analysis Report
7. **DESCRIPTION/USE:** To document the reliability data and analysis that is needed to meet the applicable Level I and Level II Systems Requirements Document in support of design analysis, reliability, testing, availability, maintainability and supportability analysis using quantitative analyses. For complex systems, if directed, the contractor shall utilize the probabilistic risk assessment (PRA), as a minimum, for the calculation of reliability estimates such as Loss of Crew, Loss of Vehicle, Loss of Mission estimates or other reliability parameters at system/subsystem level, as applicable.
8. **OPR:** QD21/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Draft as part of the Critical Design Review (CDR)
12. **SUBMISSION FREQUENCY:** Final submitted with Final Report (DRD 1273MA-007)
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.5.5
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Reliability Allocation, Predictions and Analysis Report assess the quantitative reliability system/subsystem reliability using tools such as Probabilistic Risk Assessment (PRA) and/or other quantitative reliability assessment processes, models and provide results. This assessment provides reliability roadmap with quantifiable goals at major program milestones (example, at CDR, proto-flight unit etc.) to achieve system reliability of the flight certified system and a process to validate the results (predicted versus actual). The detailed analysis results shall include subsystem/Line Replacement Unit (LRUs) reliability for each critical mission phase. Reliability models, processes and tools shall be identified and validated for their application specific to program needs to provide reasonable and verifiable results.
- 15.2 **APPLICABLE DOCUMENTS:**

MPD 8720.1	<i>MSFC Reliability and Maintainability Program for Space Systems</i>
NPR 8705.5	<i>Probabilistic Risk Assessment (PRA) Procedures for NASA Programs and Projects</i>
XXX	<i>Program Systems Requirement Document (SRD)</i>
- 15.3 **CONTENTS:** The Reliability Allocation, Prediction and Analysis Report shall use failure modes and failure rates information based on physics of failure of various mechanisms and probabilistic design analysis (as applicable) to develop reliability models and analysis which comprehensively cover system/subsystem mission profiles and environments. For systems early in the design process, initial failure rate estimates may be based on extrapolation of failures rates from similar existing systems. The result from this analysis supports the assessment of mission risks and future upgrades to minimize the risk. The Reliability Allocation, Predictions and Analysis Report shall consist of: General and programmatic information (Reliability block diagram (RBD) and other graphical representation of reliability model), results of the analysis and a roadmap to design-in-reliability right from the conceptual design stage with specific milestones for all LRUs including flight proto and certified spacecraft at subsystem and system level in accordance with 15.2 applicable documents to provide the following:
  - a. The process of integrating quantitative reliability predictions and analyses in the overall system management process and program milestones.

## DRD Continuation Sheet

**TITLE:** Reliability Allocation, Predictions and Analysis Report

**DRD NO.:** 1273RM-001

**DATA TYPE:** 2

**PAGE:** 2/2

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- b. Description of the process used in the reliability quantification including reliability allocation from system to subsystem level.
- c. Ground-rules and assumptions used in performing reliability predictions.
- d. Reliability models, including reliability logic diagrams.
- e. Data used in the Reliability predictions/analyses including data sources, derating factors and the environmental factors.
- f. Validation of models/data (NOTE: Reliability models can be validated by using data from existing proven systems to repeatedly produce known outcome and then use this model to analyze data for the new system).
- g. Identify the candidates for Probabilistic Design Analysis (PDA) and structural reliability. Provide the analysis and recommendation.
- h. Provide details of: reliability growth process, planned Reliability Demonstration Testing to ascertain physics of failure for better understanding of design uncertainties, design margins, safety factors, and design qualification testing etc.
- i. Provide roadmap for evolution of design maturity to minimize risk, program schedule and cost. Include gap analysis if appropriate.
- j. Provide reliability assessment results for each mission phase including Mean Time to Failure (MTTF), Mean Time between Failure (MTBF) and Mean Time between Maintenance Events (MTBME) information, as applicable, for each LRU/subsystem/system.
- k. Provide other details such as MTTF, MTBF and MTBME for each LRU/subsystem and system using failure rate information of each component as applicable, reliability assessment using engineering and physics based models, data from demonstration testing etc to analyze the various subsystems/LRUs of the system throughout its life cycle.
- l. Provide process details and results for the application of reliability allocation, predictions and analysis as part of design trades and design selection process based on well defined processes, tools and technology.

15.4 **FORMAT:** Contractor format is acceptable.

15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** 1273SA-001
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Safety, Health, and Environmental (SHE) Plan
7. **DESCRIPTION/USE:** A contractor generated document that describes the contractor's approach to assuring compliance with the Marshall Space Flight Center (MSFC) SHE core program requirements. The contractor's SHE Plan shall describe how the contractor will (1) prevent employee fatalities, (2) reduce the number of incidents, (3) reduce the severity of employee injuries and illnesses, and (4) protect the environment through the ongoing planning, implementation, integration and management control of the contractor's industrial safety, occupational health, and environmental program in accordance with NFS 1852.223-73.
8. **OPR:** AS10/QD12                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Preliminary with proposal
12. **SUBMISSION FREQUENCY:** Ten days after Authority to Proceed (ATP); update as required
13. **REMARKS:**
14. **INTERRELATIONSHIP:** NFS 1852.223-70, *Safety and Health*; NFS 1852.223-72, NFS 1852.223-73, *Safety and Health Plan*; FAR 52.223-3, *Hazardous Material Identification and Material Safety Data*; FAR 52.223-5, *Pollution Prevention and Right-to-Know Information*; FAR 52.223-10, *Waste Reduction Program*. DRD 1273SA-002, *Mishap and Safety Statistics Report*. SOW paragraph 2.3.1
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Safety, Health, and Environmental Plan describe the contractor's methods of planning, implementing and controlling industrial safety, occupational health, and environmental requirements to assure compliance with the MSFC SHE program over the duration of this contract.
- 15.2 **APPLICABLE DOCUMENTS:** Code of Federal Regulations (CFR) and listed consensus standards are applicable to all contracts to the extent specified in the contract. NASA and MSFC documents are applicable to all contracts performed onsite to extent specified in the contract.
 

29 CFR Part 1903	<i>Inspections, Citations, and Proposed Penalties</i>
29 CFR Part 1910	<i>Department of Labor; Occupational Safety and Health Administration Standards for General Industry</i>
29 CFR Part 1926	<i>Department of Labor; Occupational Safety and Health Administration Standards for Construction Industry</i>
CFR Title 40 Parts 1-1068	<i>Protection of Environment</i>
ANSI Standards applicable to the scope of this contract	
ASME Boiler and Pressure Vessel Code applicable to the scope of this contract	
NFPA Standards	<i>National Fire Codes</i>
NASA-STD-8719.11	<i>Safety Standard for Fire Protection</i>
NPR 8715.3	<i>NASA General Safety Program Requirements</i>
MPR 1040.3	<i>MSFC Emergency Plan</i>
MPD 1800.1	<i>MSFC Smoking Policy</i>
MPR 1800.1	<i>Bloodborne Pathogens</i>
MPR 1800.2	<i>MSFC Ergonomics Program</i>
MPR 1810.1	<i>MSFC Occupational Medicine</i>
MPD 1840.1	<i>MSFC Environmental Health Program</i>
MPR 1840.1	<i>MSFC Confined Space Entries FFFASUFF one of the FFFAFFFFAF gram</i>
MPR 1840.2	<i>MSFC Hazard Communication Program</i>

## DRD Continuation Sheet

**TITLE:** Safety, Health, and Environmental (SHE) Plan

**DRD NO.:** 1273SA-001

**DATA TYPE:** 2

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

MPD 1840.3	<i>MSFC Respiratory Protection Program</i>
MPR 1840.3	<i>MSFC Hazardous Chemicals in Laboratories Protection Program</i>
MPR 1840.4	<i>MSFC Asbestos Program</i>
MPD 1860.1	<i>Laser Safety</i>
MPD 1860.2	<i>MSFC Radiation Safety Program</i>
MPR 3410.1	<i>Training</i>
MWI 3410.1	<i>Personnel Certification Program</i>
MPD 8500.1	<i>MSFC Environmental Management Policy</i>
MPR 8500.1	<i>MSFC Environmental Management Program</i>
MPR 8500.2	<i>MSFC Environmental Management System Manual</i>
MWI 8540.2	<i>Affirmative Procurement Program for Environmentally Preferable Products</i>
MWI 8550.1	<i>Waste Management</i>
MWI 8550.2	<i>Storm Water Management</i>
MWI 8550.3	<i>Wastewater Compliance</i>
MWI 8550.4	<i>Air Emissions Compliance</i>
MWI 8550.5	<i>Chemical Management</i>
MWI 8621.1	<i>Close Call and Mishap Reporting and Investigation Program</i>
MPR 8715.1	<i>Marshall Safety, Health and Environmental (SHE) Program</i>
MWI 8715.1	<i>Electrical Safety</i>
MWI 8715.2	<i>Lockout/Tagout Program</i>
MWI 8715.3	<i>Hazard Identification &amp; Warning System</i>
MWI 8715.4	<i>Personal Protective Equipment (PPE)</i>
MWI 8715.5	<i>Building Manager Program</i>
MWI 8715.9	<i>Occupational Safety Guidelines for Contractors</i>
MWI 8715.10	<i>Explosives, Propellants, &amp; Pyrotechnics Program</i>
MWI 8715.11	<i>Fire Safety Program</i>
MWI 8715.12	<i>Safety, Health, and Environmental Finding Tracking System (SHEtrak)</i>
MWI 8715.13	<i>Safety Concerns Reporting System (SCRS)</i>
MWI 8715.15	<i>Ground Operations Safety Assessment &amp; Risk Mitigation Program</i>
MPD 8900.1	<i>Medical Operations Responsibilities for Human Space Flight Programs (NOTE: This document only applies to Space Station contracts)</i>

**15.3 CONTENTS:** The contractor's Safety, Health, and Environmental (SHE) Plan shall clearly describe their approach and methods for assuring compliance with the following MSFC SHE core program requirements and the applicable documents listed in 15.2 to the extent specified as applicable to this contracted effort.

a. Management leadership and employee involvement:

1. A description of the contractor's policy and managements commitment to (1) provide a safe and healthful workplace for personnel (i.e., employees, customers, and public), (2) protect the property and the environment, and (3) assure compliance with EPA, OSHA, NASA, MSFC MPR 8715.1 and all other MSFC SHE document requirements listed in 15.2 that are applicable to this contracted effort.
2. A description of the techniques implemented by the contractor to assure management and employees are (1) held accountable and fully understand their roles and responsibilities to perform their jobs/tasks in a safe and healthful manner while protecting the environment and (2) these roles and responsibilities are flowed-down to all subcontractors, when applicable.
3. A description of the actions taken or the disciplinary program implemented by the contractor when management or employees are discovered not performing their jobs/tasks in a safe and healthful manner or protecting the environment and how these actions are flowed-down to subcontractors, when applicable.
4. A description of the contractor's safety, health, environmental awareness programs that includes documented safety meetings and safety awareness training for employees. **(NOTE:** Onsite contractors shall document their safety meetings and safety awareness training in the MSFC Supervisors Safety Web page (SSWP).

## DRD Continuation Sheet

**TITLE:** Safety, Health, and Environmental (SHE) Plan

**DRD NO.:** 1273SA-001

**DATA TYPE:** 2

**PAGE:** 3/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

5. A description of how self evaluations of the contractor's safety, health and environmental program are performed and documented, and includes the frequency of these self evaluations.
6. Provide the identification, by title, of the individual assigned by the contractor to be responsible for implementing the contractor's SHE program elements and will serve as the day-to-day SHE Point of Contact (POC) for this contracted effort.
- b. System and worksite analysis:
  1. A description of how the contractor assures potentially hazardous conditions are identified in the work area and operations (e.g., hazard analysis, safety assessment, risk assessment and employee identified concerns).
  2. A description of how the contractor performs and documents formal worksite safety inspections as required by OSHA and provides the frequency of these safety inspections in accordance with 29 CFR Part 1903.
- c. Hazard prevention and control:
  1. A description of how the contractor assures (1) the procurement, storage, issuance, and use of hazardous chemical and materials is in accordance with MPR 8500.1 and (2) the recycling and disposal of any hazardous waste generated under this contracted effort is in accordance with MWI 8550.1 [**NOTE:** This can be described in e. environmental compliance if CPR e. is applicable.]
  2. A description of how the contractor assures all mishaps and close calls are investigated to the extent necessary to determine root cause and the reporting requirements are in accordance with MWI 8621.1. (Reference DRD 1273SA-002, *Mishap and Safety Statistics Report*).
  3. A description of how contractor employees are trained to and given the authority to suspend work where safety, health or environmental conditions warrant such action in accordance with 29 CFR 1903 and MPR 8715.1.
- d. Safety, health and environmental training:
  1. A description of how each contractor employee is (1) trained to recognize hazards, (2) avoid accidents, (3) know the hazards specific to their job, and (4) fully understands the contractor's disciplinary program in accordance with 29 CFR Part 1903, MPR 3410.1, and MPR 8715.1.
- e. Environmental compliance – A description of how the contractor assures compliance with environmental laws and regulations CFR Title 40 Parts 1-1068, Alabama Department of Environmental Management (ADEM), and MPR 8500.1 under this contracted effort by:
  1. Reporting hazardous and toxic substance use in accordance with MWI 8550.5.
  2. Implementing and reporting green procurements in accordance with MWI 8540.2.
  3. Reducing, reusing, and recycling of hazardous and toxic substances prior to disposal in accordance with MWI 8550.1.
  4. Minimizing stormwater pollution in accordance with MWI 8550.2.
  5. Ensuring equipment and processes permitted by applicable laws in accordance with MWI 8550.4.
  6. Disposing of solid and liquid materials as permitted by applicable laws in accordance with MWI 8550.1.

15.4 **FORMAT:** Contractor format is acceptable.

15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273SA-002**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Mishap and Safety Statistics Reports
7. **DESCRIPTION/USE:** To provide reporting of metrics, mishaps, close calls, and serious non-occupational injuries or illnesses.
8. **OPR:** QD12                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:**
  - a. **Safety Statistics** for the previous month shall be submitted by the 10<sup>th</sup> of each month after contract award.
    1. Safety statistics are reported using MSFC Form 4371, or an electronic notification system equivalent, or direct input to NASA Incident Reporting Information System (IRIS) database by the contractor designated IRIS representative.
    2. Safety statistics reports shall include: contract number, subcontractors, NAISC codes, number of employees, number of supervisors, hours worked, and number of injuries including days away from work and/or first-aid cases.
    3. Access to IRIS database can be obtained from the MSFC S&MA IRIS administrator located in the MSFC Industrial Safety Branch (ISB) after contract award.
  - b. **Initial reporting for ALL mishaps (Type A, B, C and D mishaps and close calls)** for **ALL** contractors working **onsite** shall be reported to MSFC Industrial Safety Branch (ISB) as soon as possible, but **no later than 1 hour** of occurrence or awareness by:
    1. Direct input through the "SHE Report" located on the Safety, Health & Environmental (SHE) webpage located on "Inside Marshall." On the SHE webpage select the "Mishaps, Questions and Concerns" pull-down menu, then select "Report Mishaps/Close Calls/ Concerns." (At MSFC this is the preferred method of reporting), or
    2. Calling the Safety Hotline (256) 544-0046 or 544-HELP (4357), option "safety," or
    3. Direct input into the NASA Incident Reporting Information System (IRIS) by the contractor designated IRIS representative.
  - c. **Initial reporting for Type A and B mishaps and high visibility close calls** for contractors working **offsite** shall be reported to MSFC Industrial Safety Branch (ISB) as soon as possible, but **no later than 1 hour** of occurrence or awareness by either of the following methods in section b.2 or b.3.
    1. If a contractor employee has any type mishap while visiting a MSFC controlled site, they shall report immediately to their site sponsor in addition to other reporting requirements.
  - d. **Initial reporting for Type C and D and low visibility close calls** for contractors working **offsite** shall be reported via the Safety Statistics Report submitted monthly. Follow-up information for these type mishaps and close calls can be requested by MSFC ISB.
  - e. **Initial reports for all mishaps and close calls** shall provide as much information as possible, but at a minimum include the following: location and time of incident, number of fatalities, number hospitalized, type of damage, estimated cost, brief description, and contact person's name and phone number in accordance with MWI 8621.1 and NPR 8621.1.
  - f. **Reporting of a non-work-related fatality or serious injury or illnesses that occur to contractor employee while working onsite shall be within 24 hours** of occurrence or awareness of injury by:
    1. Notifying the Contracting Officer and MSFC ISB. (For contractors working offsite reporting of a non-work-related injury or illness notification is at the discretion of the family.)
  - g. **Follow-up reporting for ALL contractors:**
    1. **Type A or B mishaps, or high visibility mishaps or close calls:** Follow-up report **within 24 hours** through IRIS entry by the contractor designated IRIS representative, or electronic submittal to MSFC ISB.

## DRD Continuation Sheet

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**11. INITIAL SUBMISSION (CONTINUED):**

- 2. **Type C or D mishaps, or non-high visibility close calls:** Follow-up report or update **within 6 days** through IRIS entry by the contractor designated IRIS representative, or electronic submittal to MSFC ISB.
- 3. **Type A, B, and Close Calls with high Type A or B potential Investigation Mishap Board Report:** submitted after completion of investigation. Corrective Action Plan submitted upon Endorsing Official approval.
- 4. **All Mishaps:** Follow-up Corrective Action Plan/Status 30 days after first mishap.
- h. **Safety Concerns, Hazards, and non-reportable mishaps** for contractors working **onsite** shall be reported per MPR 8715.1 and MWI 8715.13.

12. **SUBMISSION FREQUENCY:** Safety Statistics (MSFC Form 4371, IRIS entry, or an equivalent electronic submittal) - By the 10<sup>th</sup> of each month to MSFC ISB. All Mishaps: Monthly Follow-up Corrective Action Plan/Status until corrective actions implemented and closure received by updating record in IRIS data base (preferred) or electronic submittal to MSFC ISB.

**13. REMARKS:**

14. **INTERRELATIONSHIP:** DRD 1273SA-001 *Safety, Health, and Environmental (SHE) Work Agreement* and SOW paragraph 2.3.1

**15. DATA PREPARATION INFORMATION:**

- 15.1 **SCOPE:** The Mishap and Safety Statistics Reports document all mishaps and close calls as required in NPR 8621.1.

**15.2 APPLICABLE DOCUMENTS:**

NPR 8621.1	<i>NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping</i>
MPR 8715.1	<i>MSFC Safety, Health, and Environmental (SHE) Program</i>
MWI 8621.1	<i>Close Call and Mishap Reporting and Investigation Program</i>
MWI 8715.13	<i>Safety Concerns Reporting System (SCRS)</i>

- 15.3 **CONTENTS:** The Mishap and Safety Statistics Reports shall contain the information required by NPR 8621.1 and MWI 8621.1.

- 15.4 **FORMAT:** The following formats or electronic equivalent shall be submitted:

- a. MSFC Form 4371, "MSFC Contractor Accident and Safety Statistics."
- b. Mishap Board Report using the format provided in NPR 8621.1.
- c. Additional Information Submittal per MWI 8621.1.

- 15.5 **MAINTENANCE:** None required

**15.6 DEFINITIONS:**

NASA Mishap. An unplanned event that results in at least one of the following:

- a. Injury to non-NASA personnel, caused by NASA operations.
- b. Damage to public or private property (including foreign property), caused by NASA operations or NASA-funded development or research projects.
- c. Occupational injury or occupational illness to NASA personnel.
- d. NASA mission failure before the scheduled completion of the planned primary mission.

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**15. DATA PREPARATION INFORMATION (CONTINUED):**

- e. Destruction of, or damage to, NASA property except for a malfunction or failure of component parts that are normally subject to fair wear and tear and have a fixed useful life that is less than the fixed useful life of the complete system or unit of equipment, provided that the following are true: 1) there was adequate preventative maintenance; and 2) the malfunction or failure was the only damage and the sole action is to replace or repair that component.

Close Call. An event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than \$1000), but which possesses a potential to cause a mishap.

High Visibility (Mishaps or Close Calls). Those particular mishaps or close calls, regardless of the amount of property damage or personnel injury, that the Administrator, Chief/OSMA, CD, AA/OIA, or the Center SMA director judges to possess a high degree of programmatic impact or public, media, or political interest including, but not limited to, mishaps and close calls that impact flight hardware, flight software, or completion of critical mission milestones.

Type A Mishap. A mishap resulting in one or more of the following: (1) an occupational injury or illness resulting in a fatality, a permanent total disability, or the hospitalization for inpatient care of 3 or more people within 30 workdays of the mishap; (2) a total direct cost of mission failure and property damage of \$1 million or more; (3) a crewed aircraft hull loss; (4) an occurrence of an unexpected aircraft departure from controlled flight (except high performance jet/test aircraft such as F-15, F-16, F/A-18, T-38, OV-10, and T-34, when engaged in flight test activities).

Type B Mishap. A mishap that caused an occupational injury or illness that resulted in a permanent partial disability, the hospitalization for inpatient care of 1-2 people within 30 workdays of the mishap, or a total direct cost of mission failure and property damage of at least \$250,000 but less than \$1,000,000.

Type C Mishap. A mishap resulting in a nonfatal occupational injury or illness that caused any days away from work, restricted duty, or transfer to another job beyond the day or shift on which it occurred, or a total direct cost of mission failure and property damage of at least \$25,000 but less than \$250,000.

Type D Mishap. A mishap that caused any nonfatal OSHA recordable occupational injury and/or illness that does not meet the definition of a Type C mishap, or a total direct cost of mission failure and property damage of at least \$1,000 but less than \$25,000.

Offsite. A contractor that is not located on a NASA Center or NASA-owned facility.

Onsite. A contractor that is located on a NASA Center or NASA-owned facility.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 1273                      **ISSUE:** Draft
2. **DRD NO.:** **1273SE-001**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Specifications
7. **DESCRIPTION/USE:** A technical document used to describe the functional and physical characteristics of the electric Thrust Vector and Control (TVC) System and its components and how these characteristics are met. The specification may describe a system, subsystem, component, or support equipment.
8. **OPR:** ED03/JP20                      9. **DM:** JP20
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As part of Critical Design Review (CDR)
12. **SUBMISSION FREQUENCY:** Updated version submitted with the Final Report (DRD 1273MA-007)
13. **REMARKS:**
14. **INTERRELATIONSHIP:** SOW paragraph 2.5.1
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Specifications provide the performance, design detail, and verification requirements for a CI.
- 15.2 **APPLICABLE DOCUMENTS:**

MIL-STD-961	<i>Department of Defense Standard Practices for, Defense Specifications</i>
MSFC-STD-3394	<i>Standard for Contractor Configuration Management, MSFC Programs/Projects</i>
- 15.3 **CONTENTS:** The specifications shall be prepared in accordance with MIL-STD-961.
- 15.4 **FORMAT:** The format shall be in accordance with the instructions in MIL-STD-961.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by complete reissue. When a specification is placed under Government configuration control, proposed changes shall be submitted by Engineering Change Proposal (ECP) in accordance with MSFC-STD-3394.